

MIOPHYLLORHINA RIVERSLEIGHENSIS GEN. ET SP. NOV., A MIOCENE LEAF-NOSED BAT (MICROCHIROPTERA: HIPPOSIDERIDAE) FROM RIVERSLEIGH, QUEENSLAND

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A new Australian Tertiary hipposiderid is described on the basis of a maxillary fragment from RV Site, on Godthelp Hill, Riversleigh, northwestern Queensland. *Miophyllorhina riversleighensis* gen. et sp. nov. is distinguished from all other hipposiderids in its loss of P², retention of a large M³, and P⁴ longer than wide with well-developed anterolingual cingular cusp. Its phylogenetic relationships to other hipposiderids are obscure. □ *Miocene, Riversleigh, Australia, hipposiderid, leaf-nosed bat*

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Tertiary deposits in the Riversleigh World Heritage Fossil Site, Lawn Hill National Park, NW Queensland are rich in Old World bats of the Hipposideridae (Sigé et al., 1982; Hand, 1993, 1995, 1997). They comprise the majority of bats in all Riversleigh Oligocene-Miocene sites, with as many as 8 species occurring syntopically in deposits such as Upper Site (Archer et al., 1994). Many species are known from complete or nearly complete skulls as well as disarticulated but complete postcranial material. Several hipposiderid genera or subgenera are represented and others await description.

A fragment of a maxilla from RV Site (Archer et al., 1989, 1994; Creaser, 1997) represents a new hipposiderid genus distinguished by a unique combination of features. It has not been identified from adjacent, possibly contemporaneous deposits, such as the better-sampled RSO Site (Creaser, 1997). Other vertebrates from RV Site are generally fragmentary and of small to medium-sized animals. They include a skink, madtsoiid, small crocodile, chelid, peramelid, pseudocheirid and the phascolarctid *Nimiokoala greystanesi* (Black & Archer, 1997). Other bats from the site include *Rhinonictoris tedfordi* (Hand, 1997) which also occurs at adjacent sites, a vespertilionid possibly *Leuconoe* and a molossid.

Dental terminology follows Sigé et al. (1982). Specimens held in the fossil collections of the Queensland Museum (QMF), Brisbane.

SYSTEMATICS

Suborder MICROCHIROPTERA Dobson, 1875

Superfamily RHINOLOPHOIDEA Weber, 1928

Family HIPPOSIDERIDAE Miller, 1907

Miophyllorhina gen. nov.

TYPE SPECIES. *Miophyllorhina riversleighensis* sp. nov.

ETYMOLOGY. Greek *phyllo*, leaf and *rhina*, nose; *Mio*- refers to the interpreted Miocene age.

DIAGNOSIS. P² lost; P⁴ longer than wide, with deep lingual cingulum and well-developed anterolingual cingular cusp; large M³, as wide as M² and with premetacrista 3/4 paracrista length.

Miophyllorhina riversleighensis sp. nov. (Fig. 1)

MATERIAL. Holotype QMF30566, a left maxilla fragment with P⁴, M²⁻³ from Early Miocene tuffa at RV Site in System B on Godthelp's Hill, Riversleigh (Archer et al., 1989, 1994; Megirian, 1992; Creaser, 1997). RV Site is perhaps slightly younger than the South Australian Kutjamarpu Local Fauna (Woodburne et al., 1985).

ETYMOLOGY. For the Riversleigh World Heritage Fossil Site.

DIAGNOSIS. As for genus.

DESCRIPTION. Teeth worn but not broken. Alveolus for C¹ indicating this tooth wider and longer than P⁴. P² lost, with no sign of an alveolus for this tooth either within or extruded (lingually or buccally) from the toothrow. P⁴ longer than

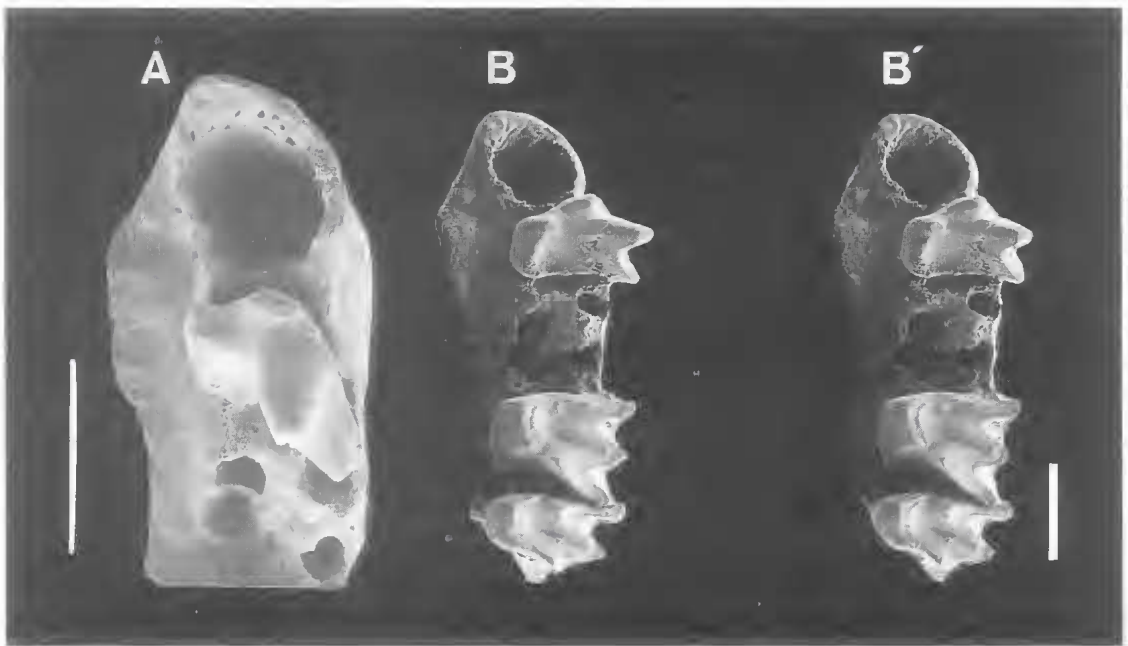


FIG. 1. *Miophyllorhina riversleighensis* gen. et sp. nov. from RV Site, Godthelp's Hill, QMF30566, holotype. A, antero-occlusal view showing lack of alveolus for P². B-B', stereopair, oblique occlusal view. Scale = 1 mm.

wide, narrower particularly anteriorly than M³ and as long. Lingual cingulum deep, well-developed; anterolingual cingular cusp well-developed. M¹ and M² with 4 evenly-spaced roots. M² with a posteriorly-directed, small but conspicuous heel. Protofossa probably open posteriorly but with wear the postprotocrista reaching the base of the metacone. Postprotocrista with a slight ridge or crest issuing from what was probably its end point (more anteriorly in this worn specimen) and extending to the thickened posterolingual cingulum. M³ not greatly reduced, as wide as M², with premetacrasta 3/4 paracrasta length.

MEASUREMENTS(mm). Holotype QMF 30566; - P⁴-M³ L=3.77; C¹ (alveolus)-M³=4.71; M²-M³=1.77; P⁴ L=0.88; P⁴ l=0.81; M² L=1.18; M² l=1.42; M³ L=0.82; M³ l=1.40.

COMPARISONS. In lacking a P², this species differs from all other Riversleigh hipposiderids, namely, *Brachhipposideros*, *Rhinonictaris*, *Xenorhinos*, *Riversleighia* and *Hipposideros bernardsigei* from the Oligocene-Miocene Neville's Garden Site (Hand, 1995) and *H. sp.* from the Pliocene Rackham's Roost Site (*H. bicolor* group). The lack of P² characterises living and extinct *Asellia*, *Cloeotis* and *H. (Syn-*

desmotis), and P² is very reduced or lacking in some members of the *H. cyclops* group (including the only fossil taxon *H. bernardsigei*). It is rarely absent in other extant species of *Hipposideros* (i.e., possibly *H. sabanus*). However, in these cases: 1) M³ is also very reduced (i.e., *Asellia* and *Hipposideros*); or 2) P⁴ is large and anteriorly very wide, with the anterolingual cingular cusp reduced, absent or located near the buccal margin of the tooth (i.e., *Cloeotis percivali* and some of the *H. cyclops* group, including *H. semoni* and *H. stenotis*); or 3) M³ is reduced and P⁴ is wider than long (i.e., *Syndesmotis megalotis*). P² is retained in all other hipposiderids, i.e., Tertiary *Palaeophyllophora*, *Pseudorhinolophus* and *Vaylatsia*, and extant *Coelops*, *Paracoelops*, *Triaenops*, *Anthops* and *Aselliscus*. It is also retained in the Rhinolophidae, the immediate sister-group of the Hipposideridae.

DISCUSSION. On available material it is not possible to determine the relationships of this species to other members of this family. Hand & Kirsch (in press) found that dental features alone are not sufficient to interpret relationships within the Hipposideridae.

In its dentition *M. riversleighensis* exhibits a mixture of what appear to be plesiomorphic and apomorphic features. For example, the loss of P²

is probably a derived feature for hipposiderids, independently acquired in a number of separate lineages. The anteriorly-narrow P^4 with prominent anterolingual cingular cusp is more difficult to interpret, but is possibly plesiomorphic among hipposiderids (Hand, 1995; Hand & Kirsch, in press). The large M^3 on the other hand is probably plesiomorphic among hipposiderids (e.g., *Hipposideros*, *Cloeotis percivali* and the *Brachhipposideros-Rhinonictis* group) but may be secondarily derived in other groups (e.g., the *H. cyclops* group; Hand, 1995).

All hipposiderids known in Riversleigh's Oligo-Miocene and Pliocene sediments retain a P^2 , as do most living Australian hipposiderids (*R. aurantius*, *H. ater*, *H. cervinus*, *H. semoni* and *H. diadema*). Only living *H. stenotis* of NW Australia, a highly specialised member of the *H. cyclops* group (Hand, 1995), lacks a P^2 . *M. riversleighensis* may be related to the *Brachhipposideros-Rhinonictis* group, sharing a similar P^4 and large M^3 .

M. riversleighensis, in lacking a P^2 , may represent an aberrant *Brachhipposideros*. However, no other species of the *Brachhipposideros-Rhinonictis* group shows this abnormality despite hundreds of specimens being available. The other very distinctive bat taxa in RV Site (a vespertilionid and a molossid) lend weight to the argument that *Miophyllorhina* is also a distinctive but poorly represented taxon.

Hand & Kirsch (in press) suggested a close relationship between *Brachhipposideros* and *Cloeotis*, early autapomorphically specialised branches of the hipposiderid radiation. Hill (1982) grouped *Rhinonictis*, *Cloeotis* and *Triaenops*; Koopman (1994) referred them to a separate subtribe, the Rhinonycterina. Perhaps *Miophyllorhina* is part of this larger group of relatively plesiomorphic hipposiderids. *Cloeotis* shares with *Miophyllorhina* a very large M^3 and lack of P^2 but its P^4 is autapomorphically quite distinct and its M^2 heel very poorly developed.

Alternatively, *M. riversleighensis* could be a distant relative of *H. bernardsigei* of the *H. cyclops* group, interpreted by Hill (1963), Flannery & Colgan (1993) and Hand & Kirsch (in press) as derived hipposiderids. However, although it shares with *Miophyllorhina* a similar M^3 , it retains a reduced P^2 and its P^4 is derived.

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